

Service Instructions SP030/03/I

Title: Main Inverter Interference Suppression

Reason for update:

☒ Infrequent Service

Urgency: **Only if required** ☐ Immediate ☒ Within 24 months
 Update material required? ☒ Yes ☐ No
 Materials free of charge? ☐ Yes ☒ No
 Return of parts? ☐ Yes ☒ No
 Estimated completion time: 2,5 hrs Number of CSE's: 1
 Customer application training? ☐ Yes ☒ No

Systems/Products affected/System identifying IVK --> see on page 3

Name	Material No.	Serial No.
see on page 3	see on page 3	see on page 3
n.a.	n.a.	n.a.

Remark: See "NOTICE" on page 4.

Components affected/to be modified

Name	Material No.	Serial No.	Component status Affected
n.a.	n.a.	n.a.	n.a.
n.a.	n.a.	n.a.	n.a.

Remark: n.a.

Chg. Ref. No.: 127507 / 130945
 Name: Gyönyör
 Dept.: CS PS 24

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Document Revision Level

This document corresponds to the version/revision level effective at the time of system delivery. Revisions to hardcopy documentation are not automatically distributed.

Please contact your local Siemens office to order current revision levels.

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Systems/Products Affected

Name of Mammography system	Units affected System Material No:	From The low-est Serial No.:	Till and including The highest Serial No.:	Remark:
MAMMOMAT C3	011 85 177	1001	1524	
MAMMOMAT 3	011 85 466	1001	1325	
MAMMOMAT 3 Stereo	011 85 482	1001	1305	
MAMMOMAT 300	061 34 717	1001	4431	
MAMMOMAT 1000/3000/300Nova	061 34 709	1001	10071	
MAMMOMAT 1000, Mo/Rh, GE.K.K	065 22 002	9153	10071	
MAMMOMAT 1000, Mo/Rh, mob. consol	065 22 010	9615	10015	
MAMMOMAT 1000, Mo/Mo, stat. consol	065 22 028	9532	10042	
MAMMOMAT 1000, Mo/Mo, mob. consol	065 22 036	10001	10004	
MAMMOMAT 1000, Mo/Rh, GE.K.K; PMS	066 07 902	9577	10016	
MAMMOMAT 3000	064 31 832	9555	10024	
MAMMOMAT 3000	064 31 840	10001	10004	
MAMMOMAT 3000	064 31 857	9422	10052	
MAMMOMAT 3000	064 31 865	9638	10004	
MAMMOMAT 3000	064 31 873	9529	10024	
MAMMOMAT 3000	064 31 881	9599	10003	
MAMMOMAT 3000	064 31 899	5587	10079	except the: 10077
MAMMOMAT 3000	064 31 907	9608	10019	
MAMMOMAT 3000, PMS	066 07 639	9534	10015	
MAMMOMAT 3000, PMS	066 07 894	9593	10007	
MAMMOMAT 3000, PMS	083 82 769	10001	10003	

Reason for this Service Instructions

Whereas the generator (cabinet) as a whole complies with the official requirements of electromagnetic compatibility, there are cases, where the oscillating electromagnetic field of the main inverter in the generator interferes with some other circuitries within. Known common examples are described in the paragraph **Explanations**.

NOTE

The activities described in this Service Instruction have to be carried out only if some MAMMOMAT generators are in fact operating in faulty manner as described in the paragraph: **Explanations**.

NOTICE

The SI SP030/03/I is applicable only on those MAMMOMATs from the table "Systems / Products effected" where the D710 with the material number 57 61 106 is built in.

It does not apply for such generators where the "old" D710, material number 86 11 154 is still in use.

If attempting to carry out this instructions on units with D710, mat. no.: 86 11 154, damage to the inverter could occur.

Explanations

Such interferences can manifest themselves through occasional display of false data of the product "mAs" measured in AEC mode during the exposure. It was proven that the AEC function - even in those intermittently occurring cases - is flawless, the exposure is switched off correctly, and the resulting blackening of the film is within tolerances. However, the displayed data are way off the actually accrued mAs.

Few cases have been reported where the test of the "Dose-min-Monitoring" performed with shielded/covered AEC detector at low kV did not lead to display of the expected ERR450, which then led to assumption that the Dose-min-Monitoring actually doesn't work. But perhaps simply a few interfering pulses might have been induced and mistakenly counted.

NOTE

The remedy, id est the effective suppression of the radio-interference of the main inverter is the main reason for essential part of this Service Instruction. Always perform first the repair according to this instruction whenever encountering false mAs display post exposure or missing ERR450, when expected due to generator settings.

Continue with troubleshooting should fault persist.

Operation of some generators on which remedial measures were implemented has indicated that there is a need to adjust the delay time for the "I_max" detection. Due to tolerances in electronic components the situation on those few generators might have led to

incidence of such state of circuitry which usually resulted in ERR607 or ERR606, possibly ERR605.

NOTE

The remedy, id est the adjustment of time constant in the "I_max" detection is the reason for the second part of this Service Instruction.

Always perform first the repair according to this instruction whenever encountering ERR607 or ERR606, possibly ERR605.

Prerequisites

Document print no. SPB7-230.091.01.04.02 "MAMMOMAT Power stage service kit" Repair Instructions.

NOTE

If encountering a MAMMOMAT, with a generator having the D710 material number 86 11 154, the SI 030/03/I shouldn't be performed.
The above mentioned document contains some additional information for better understanding.

Special Tools / Documents

AMP contact ejector - AMP No: 725840

Soldering set (soldering iron and solder)

Installation and Start-Up Instructions (originally delivered with the MAMMOMAT) for guidance how to remove and re-assemble the generator front cover and for enumeration of relevant safety precautions.

NOTE

All safety precautions mentioned in the Installation and Start-Up Instructions and in the technical documents, especially the indications of danger of electrocution, have to be strictly observed.

Special notification

In light of the Instruction under Points 5 & 6 further in this document it has to be realized, that the Update Instruction SP010/99/P, Inverter Interference, has no validity anymore. The MAMMOMAT systems designated as affected in that instruction may become subject to worksteps described herein.

Should any occurrences stipulated under the Chapter "Reason for this Service Instruction" manifest themselves on MAMMOMAT systems listed in the UI SP010/99/P, the present instruction has to be considered as valid.

Ordering Information

This service kit can be ordered from the Material Logistics of the Customer Services (CSML-SAP Distribution Channel, factory 2050):

Material Number: **086 20 556 "Repair kit - Main Inverter Interference Suppression"**

Whereas this is a Service Instruction of the I-Type (Infrequent Service) the kit will be made available also as a Spare Part, so that it can be ordered anytime in future, after the period of 24 months set for the implementation of this instruction has expired.

Contents of the Service Kit

The Service kit **86 20 556** contains essentially following parts:

Item	MatNo	Description	Quantity
1	8620549	Single lead D700, X3 - D710, X6.3	1
2	2049708	Solder-remover braid Type AA-1.5mm	1
3	7751001	Capac. MKT 100nF 63V - 10% GR8X7X2,..	4
4	4685756	EMI-FERRIT 47x28.5 EFC25S, flat	1
5	8620564	Comparator LM311 with Capacitor 680pF	4
6		This Instruction: SPB7-230.896.14.	1

Tab. 1

Return of Parts

Removed parts do not have to be returned.

Important Information

Whenever the operator of a MAMMOMAT system indicates to the Customer Support Engineer, or the CSE experiences at least one of the listed faults:

- false mAs display post exposure,
- the non-occurrence of the ERR450 when normally expected
- occurrence of ERR607, ERR606 or ERR605

the particular remedy should be attempted by performing repair either:

- by carrying out the whole procedure described herein, or
- by carrying out a particular part of it.

The kit provided with this instruction will bring about a substantial suppression of electro-magnetic interference originating in the main inverter. As a result of its application one of the main causes of faulty functions described here will be eliminated.

However, one has to realize that there might be other causes for similar faults, especially for those faults where Error messages 450, 607, 606 or 605 are being displayed.

Should Error messages persist after correct application of the kit, usual troubleshooting as described in pertaining technical documents has to be performed.

Scope of work

NOTE

The number of work steps to be performed depends on which revision the actual board D710 has.

The revision level the PC Board has can be determined by looking at the row of numbers underneath the part number of the board.

The number crossed out is the revision you have.

AS00 - This is the original one. All the work steps have to be done.

AS01 - Steps 1 & 2 have been done in the factory, please confirm that this is true.

AS02 - This will be the revision of the board having done the appropriate steps. Please mark on the board.

AS03 - The board with this revision level has already been modified from the factory.

The ferrit core has to be put in place when the boards have been installed, in case it is missing.

The ground connection to the frame should not exist - read and perform work steps 5 & 6, if needed.

In order to decide the scope of work needed the CSE has to ascertain the Revision level of the built in PCB D710 - Main Inverter. The aim in the field is to update the D710 to the Revision level 02 (in German: Ausführungsstand = AS02). The AS02 is electrically equivalent to the AS03; the difference is only in the place the four capacitors 680 pF (30 86 865) are soldered to.

If the modification of D710 is made in the field, the revision level is called AS02, if the modification is performed through soldering the capacitors onto the backside of the PCB already in course of regular manufacturing; the resulting revision level of the PCB D710 is called AS03.

Therefore, when the CSE encounters a PCB D710 of the Revision level AS00, this entire instruction, all the listed working steps have to be implemented,

When the CSE encounters a PCB D710 of the Revision level AS01, the

Working Steps: "Remove the four diodes V301 ... V304", and
"Exchange the 22nF gate capacitors C301 ... C304"

do not need to be performed, as they have been implemented already (a visual cross-check of the board is recommended, anyway).

Further to inspecting the D710, the CSE has to check, whether the Ground connection has been interrupted, and whether the Hinged Ferrite core has been affixed. Should these two activities be missing, they have to be performed according to the description herein.

NOTE

All works described in following paragraphs will be performed on system switched OFF.

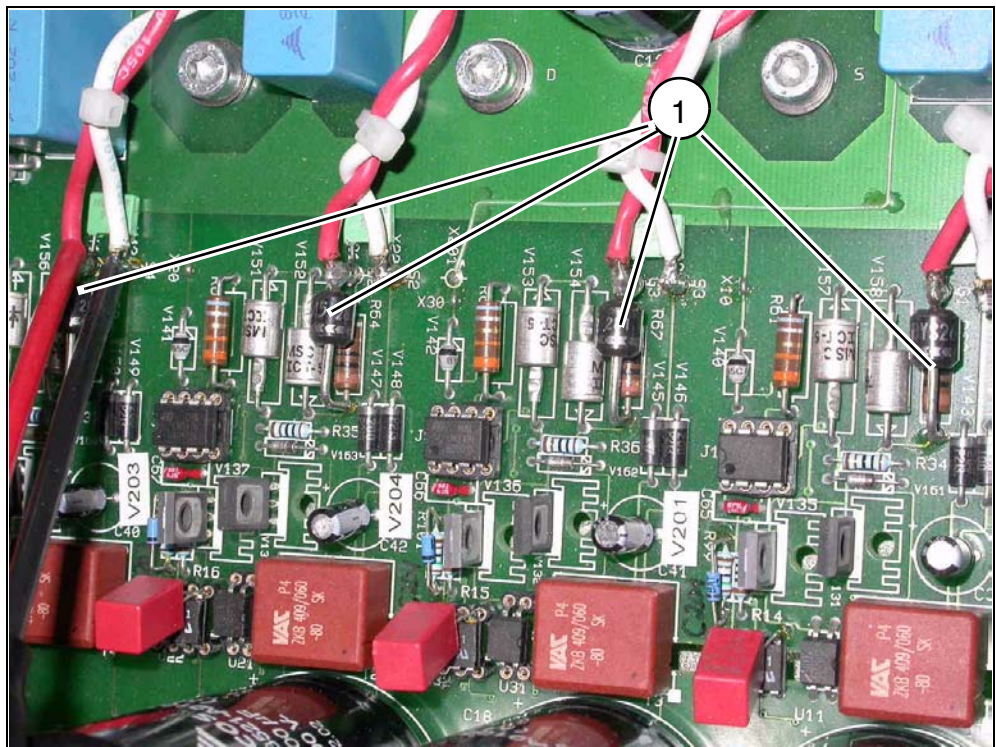
Work Steps

A) Removal of diodes and exchange of capacitors and comparator integrated circuits on the Printed Circuit Board D710 "Inverter - material no: 5761106, Rev. level 00. It is not necessary to disassemble and remove the board.

Protect places below against drops of solder.

1. Remove the four diodes V301 ... V304 as described here.

They are not marked on the board but are located above the Resistors R62, R63, R64 and R67. See 1/Figure 1.



2. **Exchange the 22nF gate capacitors C301 - through - C304 with the supplied 100 nF capacitors, material no: 7751001.**

They are not marked but located across the lugs where the wires from the power modules are normally attached. See Figure 2.

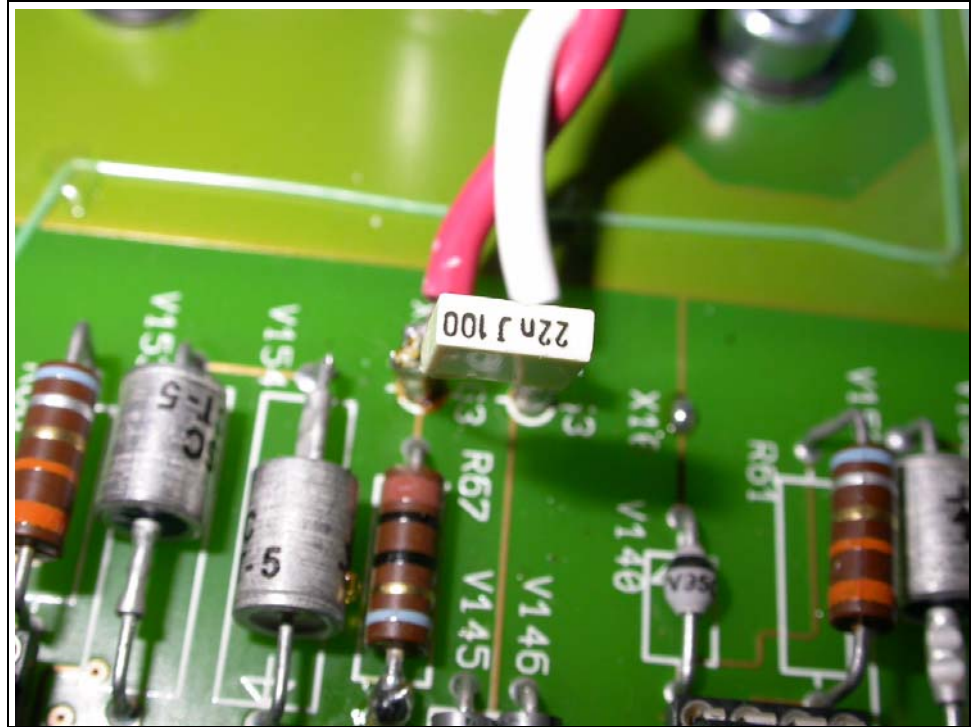


Fig. 2

- Re-attach the 4 pairs of leads from the power modules exactly as they were before.

3. **Exchange the comparators Type LM311, denoted as J2, J3, J5 and J1 (marked so from left to right on the built-in D710) for the supplied ones.** On those comparators note the Surface-mounted device (SMD) capacitors 30 86 865 soldered between pins 3 and 4, see Figure 3.

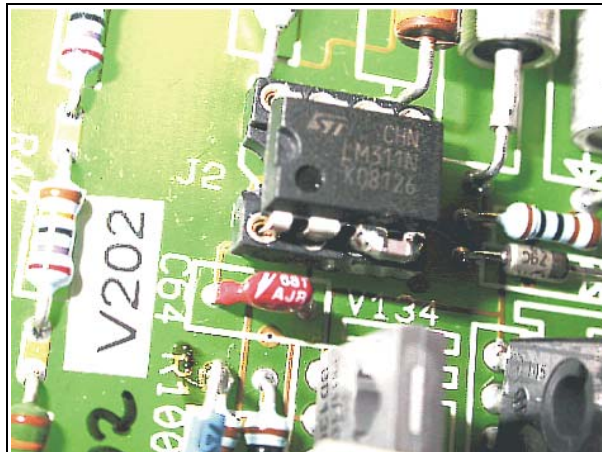


Fig. 3

4. With these changes the D710 has been transformed to the Revision level 02

Mark / cross the corresponding field (02) in the upper left corner of the D710 with an indelible marker pen.

B) Disconnecting the "0 Volt - signal" of the connector X6 on the Inverter PCB, D710 from the frame/ground (GND) and connecting the 0 Volt - signal straight to the backplane D700.

5. Interrupt the ground connection.

- Loosen the screw fixation of the cable lug D710, X6.3 from the generator frame;
- Pull the connector X6 from the inverter D710, the connector X6 on the backplane D700 can remain plugged in;
With the help of the contact ejector (AMP 725 840) remove the sleeve (female contact) X6.3 of that grounding lead from the free AMP connector housing;
- Insert the pin (male contact) of the supplied ready-made lead "D710, X6.3 <-> D700, X6.3" - material no: 8620549 - into the corresponding place in the housing of the AMP connector X6 on the backplane. On the backplane the pin can be inserted into the X6 even if X6 is plugged. Insert the sleeve on the other end into the connector going to the D710 on its place X6.3. Watch for the sound made by the contacts when they snap in. Crosscheck the firm and secure latching by means of a light pull on the lead.

6. Interconnect 0 Volt-signal on the D710 and the D700.

Plug / insert the connector X6 into the socket X6 on Inverter D710.

The figure 4 shows such state; the grounding wire was removed from frame.



Fig. 4

C) Application of the ferrite core**7. Affix the supplied hinged ferrite core.**

Place the ferrite - material no: 4685756 - around the ribbon cable near to the connector X2 at the inverter board D710.

For placement see Figure 4, for opening the hinged core see 1/ Figure 5.

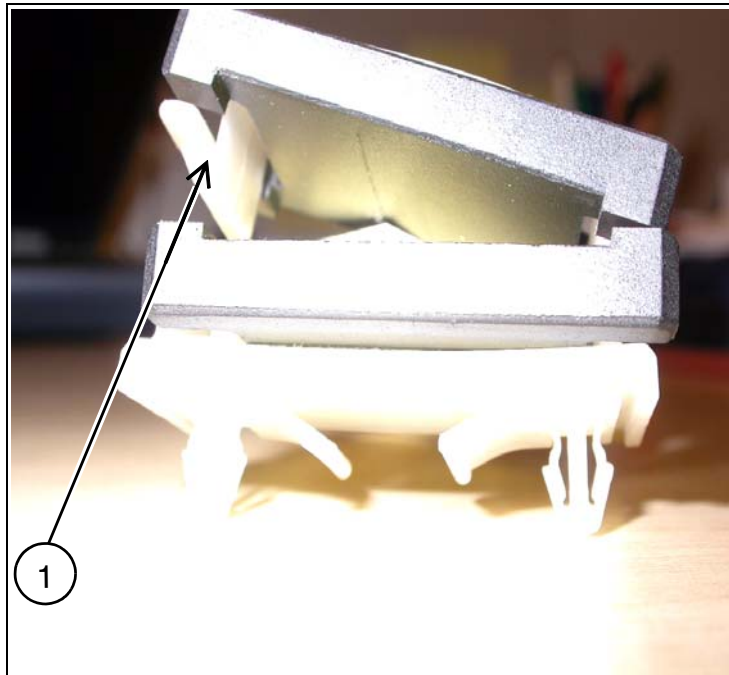


Fig. 5

Final Check, Concluding steps

Mount protective Plexiglas / Perspex in front of D710, switch system ON; check correct operation by test exposure(s) according to modifications that have been made.

Switch system OFF and re-assemble the generator front cover.

Customer Information

Demonstrate correct operation to the customer and hand over the system.

Request a callback if function not satisfactory.

Final Work Steps

- Update the system documentation.
Update the revision level, the operating instructions and the technical documentation. Fill out, and if needed, make a copy of the attached "Completion Protocol/ Update Completion Form" and file it in the corresponding System Binder/User Handbook.
- This update does not include an IVK.
 - Changes in the IVK structure must be reported to the management system to correct the installed volume.
- Updates that have already been completed prior to publication of this SI must also be reported.
 - The modification reply cards (Type 606) previously distributed with the publication of updates may apply for few Agencies only.

- The modification reply report has to be prepared by authorized personnel using an application on the Intranet.)

Changes to Previous Version

"NOTICE" on page 4 inserted.

Completion Protocol / Update Completion Form

The update with the number **SP030/03/I** has been completed.

Material number:

Serial number:

Customer: Functional Location:

Customer No.:

Name (CSE): Telephone:

Country: Location:

Date: Signature:

Remark:

.....

NOTE

After completing the update, make a copy of this page, fill it out and file it in the corresponding System Binder/User Handbook.

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